

IN THE CLAIMS

1. A turf aerator, comprising:
 - a) a frame;
 - b) an engine mounted on the frame for powering the aerator having a power take-off shaft;
 - c) a pair of tine shafts rotatably mounted in the frame, each tine shaft having a plurality of tines thereon for aerating the turf; and
 - d) a differential shaft mounted to the frame operatively connected to and clutched with the power take-off shaft and further operatively connected to each tine shaft as to give variable rotation to each tine shaft.
2. The aerator of claim 1, wherein the differential shaft has a left side and a right side and further comprising a hand-actuated brake on each side of the differential shaft to variably control the rotation of the differential shaft and the tine shafts.
3. The aerator of claim 1, further comprising a pair of roller shafts rotatably mounted in the frame with a drive roller on each shaft and each roller shaft being operatively connected to a left side or a right side of the differential shaft, respectively.
4. The aerator of claim 3, wherein the differential shaft's operational connections to the tine shafts and roller shafts are outside the frame for easy servicing.
5. The aerator of claim 1, further comprising a biased lifting assembly mounted to and below the frame for lifting and holding the tines out of the turf to place the aerator in a biased transportation mode from an operational mode.
6. The aerator of claim 3, wherein the drive rollers are molded directly to the roller shafts and wherein the drive rollers and roller shafts are sufficiently massive such that the addition of water to the drive roller, or other weighting method, is not required to facilitate penetration of the tines into the turf.

7. The aerator of claim 1, further comprising:
a steering handle, the steering handle being mounted to the frame;
a pair of brake levers; and
a pair of brake hand guards, the brake levers and hand guards being mounted
on the steering handle.

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8. The aerator of claim 1, further comprising a differential shaft coupling disposed on the differential shaft, wherein the coupling allows for disassembly of the differential shaft for maintenance and servicing.

9. A turf aerator comprising:

10 a) a frame;
b) an engine mounted on the frame for powering the aerator having a power take-off shaft;
c) a pair of tine shafts rotatably mounted in the frame, each tine shaft having a plurality of tines thereon for aerating the turf and differentially operatively connected to and clutched with the power take-off shaft as to give variable rotation to each tine shaft; and
15 d) left side and right side hand-actuated brakes operatively connected to the tine shafts to variably control the rotation of the tine shafts.

20 10. The aerator for claim 9, further comprising a differential shaft mounted to the frame operatively connected and clutched with the power take-off shaft and operatively connected to each tine shaft.

11. The aerator of claim 10, wherein the differential shaft has a left side and a right side wherein the hand-activated brakes are on each side of the differential shaft to variably control the rotation of the differential shaft and the tine shafts.

25 12. The aerator of claim 10, further comprising a pair of roller shafts rotatably mounted in the frame with a drive roller on each shaft and each roller shaft being operatively connected to the differential shaft.

13. The aerator of claim 12, wherein the differential shaft's operational connections to the tine shafts and the roller shafts are outside the frame for easy servicing.

14. The aerator of claim 9, further comprising a biased lifting assembly mounted to and below the frame for lifting and holding the tines out of the turf to place the aerator in a biased transportation mode from an operational mode.

15. The aerator of claim 12, wherein the drive rollers are molded directly to the 5 roller shafts and wherein the drive rollers and roller shafts are sufficiently massive such that the addition of water to the drive rollers, or other weighting method, is not required to facilitate penetration of the tines into the turf.

16. The aerator of claim 9, further comprising:
10 a steering handle, the steering handle being mounted to the frame;
a pair of brake levers; and
a pair of brake hand guards, the brake levers and hand guards being mounted to the steering handle.

17. The aerator of claim 10, further comprising a differential shaft coupling disposed on the differential shaft, wherein the coupling allows for disassembly of the 15 differential shaft for maintenance and servicing.

18. A turf aerator, comprising:
20 a) a frame;
b) an engine mounted on the frame for powering the aerator having a power take-off shaft;
c) a pair of tine shafts rotatably mounted in the frame, each tine shaft having a plurality of tines thereon for aerating the turf and differentially operatively connected to and clutched with the power take-off shaft as to give variable rotation to each tine shaft; and
d) a pair of roller shafts rotatable mounted in the frame with a drive roller 25 on each shaft and each roller shaft being differentially operatively connected to and clutched with the power take-off shaft as to give variable rotation to each roller.

19. The aerator of claim 18, further comprising a differential shaft mounted to the frame operatively connected and clutched with the power take-off shaft and operatively 30 connected to each tine shaft and each roller shaft.

20. The aerator of claim 19, wherein the differential shaft has a left side and a right side and further comprising a hand-activated brake on each side of the differential shaft to variably control the rotation of the differential shaft, the tine shafts and the roller shafts.

21. The aerator of claim 19, wherein the differential shaft's operational
5 connections to the tine shafts and roller shafts are outside the frame for easy servicing.

22. The aerator of claim 18, further comprising a biased lifting assembly below the frame for lifting and holding the tines out of the turf to place the aerator in a biased transportation mode from an operational mode.

23. The aerator of claim 18, wherein the drive rollers are molded directly to the
10 roller shafts and wherein the drive rollers and roller shafts are sufficiently massive such that the addition of water to the drive rollers, or other weighting method, is not required to facilitate penetration of the tines into the turf.

24. The aerator of claim 18, further comprising:
15 a steering handle, the steering handle being mounted to the frame;
a pair of brake levers; and
a pair of brake hand guards, the brake levers and hand guards being mounted to the steering handle.

25. The aerator of claim 19, further comprising a differential shaft coupling disposed on the differential shaft, wherein the coupling allows for disassembly of the
20 differential shaft for maintenance and servicing.

26. A turf aerator, comprising:
25 a) a frame;
b) an engine mounted on the frame for powering the aerator having a power take-off shaft;
c) a pair of tine shafts rotatably mounted in the frame, each tine shaft having a plurality of tines thereon for aerating the turf and differentially operatively connected to and clutched with the power take-off shaft as to give variable rotational to each tine shaft; and

d) a biased lifting assembly with wheels mounted below the frame for lifting and holding the tines out of the turf to place the aerator in the biased transportation mode from an operational mode.

27. The aerator of claim 26, further comprising a differential shaft mounted to the
5 frame operatively connected and clutched with the power take-off shaft and operatively connected to each tine shaft.

28. The aerator of claim 27, wherein the differential shaft has a left side and a right side and further comprising a hand-activated brake on each side of the differential shaft to variably control the rotation of the differential shaft and the tine shafts.

10 29. The aerator of claim 27, further comprising a pair of roller shafts rotatably mounted in the frame with a drive roller on each shaft and each roller shaft being operatively connected to a left side or a right side of the differential shaft, respectively.

30. The aerator of claim 29, wherein the differential shaft's operational connections to the tine shafts and roller shafts are outside the frame for easy servicing.

15 31. The aerator of claim 29, wherein the drive rollers are molded directly to the roller shafts and wherein the drive rollers and roller shafts are sufficiently massive such that the addition of water to the drive rollers, or other weighting method, is not required to facilitate penetration of the tines into the turf.

32. The aerator of claim 26, further comprising:
a steering handle, the steering handle being mounted to the frame;
a pair of brake levers; and
a pair of brake hand guards, the brake levers and hand guards being mounted to the
5 steering handle.

33. The aerator of claim 27, further comprising a differential shaft coupling disposed on the differential shaft, wherein the coupling allows for disassembly of the differential shaft for maintenance and servicing.

34. A turf aerator, comprising:

- 10 a) a frame;
- b) an engine mounted on the frame for powering the aerator having a power take-off shaft;
- c) a pair of tine shafts rotatably mounted in the frame, each tine shaft having a plurality of tines thereon for aerating the turf;
- 15 d) a differential shaft with a left side and a right side mounted to the frame operatively connected to and clutched with the power take-off shaft and further operatively connected to each tine shaft as to give variable rotation to each tine shaft;
- e) left side and right side hand-activated brakes on each side of the
20 differential shaft to variably control the rotation of the differential shaft;
- f) a pair of roller shafts rotatably mounted to the frame with a drive roller on each shaft and each roller shaft being operatively connected to the left side or the right side of the differential shaft, respectively, wherein the drive rollers are molded directly to the roller shafts and wherein the drive rollers and roller
25 shafts are sufficiently massive such that the addition of water to the drive rollers, or other weighting method, is not required to facilitate penetration of the tines into the turf;
- g) a biased lifting assembly mounted to and below the frame for lifting and holding the tines out of the turf to place the aerator in a biased
30 transportation mode from an operational mode;

h) brake levers and brake hand guards, the brake levers and hand guards being mounted on a steering handle, the steering handle being mounted to the frame; and

5 i) a differential shaft coupling disposed on the differential shaft, wherein the coupling allows for disassembly of the differential shaft for maintenance and servicing.

35. Method of turning a powered aerator, said method comprising:

engaging the clutching system, thus transferring power from the engine to the tine shaft and drive rollers such that the aerator is driven forwardly;

10 actuating the left brake to slow the rotation of the left side of the differential shaft which slows the rotation of the left tine shaft and left drive roller, causing the aerator to turn to the left with a concomitant increase in the rotational speed of the right tine shaft and the right drive roller; and

15 actuating the right brake to slow the rotation of the right side of the differential shaft which slows the rotation of the right tine shaft and right drive roller, causing the aerator to turn to the right with a concomitant increase in the rotational speed of the left tine shaft and left drive roller.

36. The method of claim 35, further comprising:

5 applying pressure by the operator on the right side of the steering handle resulting in the slowing of rotation of the left side of the differential shaft which slows the rotation of the left tine shaft and the left drive roller while the rotational speed of the right tine shaft and the right drive roller increase, causing the aerator to turn to the left; and

10 applying pressure by the operator on the left side of the steering handle resulting in the slowing of the rotation of the right side of the differential shaft which slows the rotation of the right tine shaft and the right drive roller while the rotational speed of the left tine shaft and the left drive roller increase, causing the aerator to turn to the right.